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On the AGRICULTURAL STATISTICS *of the* UNITED KINGDOM.

By JAMES CAIRD, ESQ.

[Read before the Statistical Society, March, 1868.]

I.

I HOLD in my hand a little blue book which has cost the country ten thousand pounds, and yet it is one of the cheapest ever published at the public expense. It contains the agricultural returns of 1867, obtained from nearly 500,000 persons, on every farm, large and small, in Great Britain; and the more it is studied the more clearly will it show the immense value to the public of the facts which it embraces, and the brief yet perspicuous manner in which they are presented. The greatest credit is due to the departments through which they have been gathered—to the Inland Revenue, by whose organisation this most extensive inquiry has been conducted, and to the statistical department of the Board of Trade, by whom the returns have been collated and elaborated.

Twenty years' experience has now been gained of free trade in corn. In that time we have imported nearly one hundred and twenty million quarters of wheat, which is a yearly average four times greater than that of the twenty preceding years. Since 1861, the annual imports of all kinds of corn have averaged three million tons in weight, equivalent to one voyage of the total tonnage of the United Kingdom employed in the foreign trade. The official value of these yearly imports has ranged during that short period between twenty and forty millions sterling. Of the whole corn of all kinds consumed in this country, we receive one-fourth from abroad, and for the great staple—the staff of life—wheat, we are dependent on the foreigner for one-third of our annual supply.

Returns which have given us a basis of certainty upon which to compute our annual requirements, and to provide for them—and which will tend to prevent panic, and sudden and unnecessary fluctuations, in interests so vast and important—are indeed cheaply purchased by so small a cost. It will be my task in this paper to exhibit their general results, and to show some of the modes by which they may be used for the public advantage.

It may be interesting at this point to note in a single paragraph the principal changes which have taken place in English agriculture during the last three centuries. In the middle of the sixteenth century, beef and pork were sold at a halfpenny a pound, mutton and veal at a halfpenny half-farthing. The preamble of the statute fixing these prices, states that these "four kinds of butchers' meat "were the food of the poorer sort." But there was a scarcity of corn. Laws were therefore enacted against throwing the land into pasture. The number of sheep allowed to be kept by one farmer was restricted to 2,000. No corn was allowed to be exported. An acre of good land in Cambridgeshire was let at a shilling. A hundred years later there seems to have been a regular importation of foreign corn, it having been computed that 2,000,000*l.* went out in one year to pay for it. The high price led to increased home production. Then began a new policy. Not only was the exportation of corn allowed, but it was stimulated by a bounty. A hundred years later, in 1753, corn riots disturbed the country, and continued during that and the following years, in consequence of the high price of corn, alleged to be caused by the bounty on its exportation. After that the country passed through a period of protection against foreign corn, and a stimulus was thus offered in a different direction to its home growth. When that policy finally disappeared in 1848, the great bulk of the people had ceased to know anything of butchers' meat, except as an occasional Sunday luxury. Now, after twenty years of free trade, clear of all stimulus of bounty or protection, the natural balance brings us round to a position in which every country, according to its own interests, has become tributary to us for the various supplies that we require; our own soil is applied to the production that each man finds most remunerative; and, participating in the general welfare, the great body of the people are able to share, not only in the bread, but in the meat from which their fathers for three generations were compelled to abstain.

The chief advantage of the returns is the certainty we have thereby obtained of the acreage of our various crops, and of the numbers of the different kinds of live stock. If we compare the facts now ascertained with the estimates most carefully prepared in 1853 by that eminent authority, the late Mr. McCulloch, we find a remarkable agreement in the total acreage of corn, but a great difference in two of the principal kinds. The wheat is nearly the same in both—3,640,000 in the returns, and 3,750,000 in the estimate. In barley there is an immense discrepancy, especially as regards England, where two million acres are returned, and one million estimated. For Scotland and Ireland the error is the other way, 388,000 acres being returned, and 750,000 estimated. In oats the discrepancy is about one million acres, much of which can be accounted for by the ascertained diminution which has taken place since 1853, the date of the estimate. And, in regard to barley, there cannot be a doubt that a great increase since that time has been made to the acreage, from the gradually rising proportion which of late years the price of barley has borne to wheat.

I cannot leave this part of the subject without recording my admiration of the general accuracy of Mr. McCulloch's estimate of the total acreage of corn, viz., 11,470,000, as compared with 11,450,000 shown by the returns.

Nothing like the same accuracy is to be found in some of the estimates of live stock. In 1836, the number of cattle in the United Kingdom was estimated by one writer, quoted by a leading agricultural authority, at 15,400,000. The actual numbers now are found to be 8,700,000. The sheep in Great Britain were estimated at 48,000,000: the actual numbers are 28,000,000. The pigs were estimated at 18,000,000: the actual numbers are 4,000,000. In number and value that great branch of our national property, the live stock, seems thus to have been estimated at 100 per cent. more than really existed!

The changes that have taken place in Scotland and Ireland during the last ten years are shown in the returns, and are very considerable, the acreage of wheat having dropped one-half in that period. The loss of wheat in Scotland has been recovered by a nearly equal increase in barley and oats, but in Ireland there has been a loss also in each of these crops of about a sixth. It is nearly compensated by a gain, during the same period, of 120,000 cattle, 1,000,000 sheep, and 278,000 pigs. The most striking change recorded is seen by the Irish returns—conducted so ably for more than twenty years by the registrar-general, Mr. Donelly—which show in the following figures the production of corn and potatoes:—

	Corn.	Potatoes.
	Qrs.	Tons
1857. Total estimated yield	11,500,000	3,500,000
'66. "	8,800,000	3,000,000

These ten years mark a great change in the husbandry of Ireland, the production of corn having fallen nearly one-fourth, while that of potatoes has declined one-seventh. That a change in the same direction in regard to corn has been going on in England I have no doubt, though not to anything like the same extent. But the rapidity and magnitude of the changes which are now known to have taken place in the breadth of corn land, in Ireland and Scotland, are most convincing proofs of the public advantage of annual returns for the whole kingdom.

II.

The acreage having been obtained, the first step, in reckoning the produce of the crop, is to find the yield per acre of an average of years, and the influence of seasons on the yield of each year. I here confine myself to the yield of wheat, which is the staple bread corn of the country.

No one can have studied this subject without being impressed with the great care bestowed on the question by Mr. Jacob, Mr. Tooke, Mr. Newmarch, and Mr. McCulloch. When, therefore, in putting forth an estimate of our crops in 1851, I felt myself obliged to differ from these very eminent authorities, I ventured to do so only from the conviction that the extent of my own inquiries, as "Times'" commissioner, in nearly every county in England, had given me a command of facts not before accessible. Thirty to thirty-two bushels of wheat an acre had been accepted as the average produce of this country. The facts I had ascertained led me to fix it, in 1850, at not more than 26½,—and, notwithstanding the improvements which in the last eighteen years have been made, I do not believe that the average yield of England at this time exceeds 28 bushels.

After a certain point is reached the progress of average yield per acre is very slow. Arthur Young, in 1770, summed up the result of his inquiries at an average of 23 bushels an acre. In 1850 mine gave 26½, the whole increase in eighty years being thus only 3½ bushels. Careful inquiry and observation lead me to the conclusion that, in the eighteen years which have since elapsed, it would not be safe to take credit for an increase greater than 1½ bushel, and even that is nearly twice the rate of progress of the preceding eighty years. We must not forget that a large portion of the wheat land of England is clay of moderate quality, as is proved by the fact that there are still one million acres every year in bare fallow. The average produce of wheat in Ireland during the last twenty years, has been found to be a little under 24 bushels. But even this is higher than that of any of our European neighbours, and 50 per cent. above the average of France. Taking the proportion of acreage in England and Ireland, I find 27 bushels to be the average yield of the United Kingdom.

The influence of seasons on the yield is the next step to be considered. Its magnitude and effects are very easily illustrated. Of the last twenty years, 1854 and 1863 were the most prolific seasons; 1853 and 1867 the worst. The difference in weight and yield of wheat in 1863 and 1867, was equal to 14 bushels an acre, 1863 having been 8½ bushels above the average, and 1867 5½ below it. The result is as follows:—

	£	£
Cost of wheat and flour, 1863	40,000,000	—
Of which paid for foreign corn	—	6,100,000
Cost of wheat and flour, 1867	70,000,000	—
Of which paid for foreign corn	—	33,500,000
Difference caused by bad season	30,000,000	27,400,000

Not only is the price augmented to the consumer by the whole amount of this loss, but nearly the whole of it goes out of the country. There are many here more competent than I to reckon its influence on trade and commerce; and to estimate the value of being early forewarned, that thirty millions sterling more will be required in a given year to pay for the bread corn of the people, and twenty-seven millions more gold be exported in its purchase from abroad.

I have framed the following table, showing the fluctuations of the seasons, and their effect on the yield of wheat in the last twenty years, on the basis of the experiments of Mr. Lawes, in Hertfordshire, which have proved a very satisfactory index of the general yield over the chief wheat producing area of the kingdom, and are indeed the most instructive series of facts for the guidance of the British corn-grower on record.

	Yield in Bushels *Minus* or *Plus* the Average.
First Cycle of Six Years—	
1848	− 9¾
'49	− 1
'50	− 5
'51	− 3
'52	− 7
'53	− 16
Second Cycle of Six Years—	
1854	+ 9
'55	+ 1
'56	+ 1
'57	+ 7½
'58	+ 6
'59	average
Third Cycle of Six Years—	
1860	− 3
'61	− 1
'62	+ 5
'63	+ 12½
'64	+ 7½
'65	+ 4
Fourth Cycle—Commencement of—	
1866	− 2
'67	− 6

A careful consideration of these figures will bring out many points of interest affecting the revenue and wealth of the country, and the comfort of the people. For it is well that we should remember that every requisite of food or clothing is an annual product of the earth, yielded, no doubt, to a large degree, in proportion to the ingenuity and industry employed on it by man. But when man has done his utmost, the result is determined by influences beyond his control. In the literal words of the great apostle, Paul may plant and Apollos water, but God giveth the increase. Of those substances on which life and health day by day depend, there is every year a new production. There is not a single article of food and clothing that is not, directly or indirectly, of vegetable growth; not accumulated and stored away in the bowels of the earth like our mineral wealth, but dependent year by year on the sun and rain in due season. If we draw a line in the column, beginning with 1854 and ending with 1865, we shall find the remarkable fact, that in these twelve years there were ten good harvests in England, and only two below an average. This covered the whole period of Lord Palmerston's successful administration. During these twelve years we had to bear the burden of the Crimean war, followed by the Indian mutiny, and the increased military expenditure begun in 1860. From 1855 to the last year, our annual expenditure has averaged sixty-seven millions as against the fifty millions of preceding years, and during that period there has been an actual diminution of taxation of from five to six millions, with no increase in the national debt. Can it be doubted that such a run of propitious seasons aided the gifted minister who conducted the finances of this country to meet successfully our vast expenditure, not only without serious pressure on the people, but with largely increased development of their industry and resources?

Now, this element of uncertain seasons, against which man is powerless to provide, is in reality not so difficult to estimate in its effects as it appears. The great bulk of wheat in this country is produced along the eastern and southern seaboard, from York to Devon, and the adjoining inland counties, extending over little more than three degrees of latitude, within which climate and seasons are very much alike. Hence a few careful trials will very accurately reveal the yield over the whole region. The annual trials of Mr. Lawes, in Hertfordshire, which have been conducted with the greatest care for more than twenty years, have proved a wonderfully accurate test of the general yield of the country. That county is a nearly central point in the wheat region. But we need not limit ourselves to it. Accurate trials of yield in various parts of the district may be made by anyone who will take the necessary pains; and according to the care and judgment bestowed, will be the benefit derived in an early appreciation of the result. As greater facility is acquired by experience in the collection of the returns of acreage, we may hope soon to have the facts published in August or early in September. The abstract for Ireland was published for 1867 on 12th September. The public will then have only to apply to that acreage their own ascertained rate of yield, and the total crop of the year will be known. Our farmers being first in the market, and most competent of all persons to test the yield, will be in a position to derive the earliest advantage from the returns.

Let us now apply the preceding data to a calculation of the yield of the last harvest. By the middle of September let us suppose that we have had in our hands the returns of acreage. We take examples from various districts typical of the climate of the year, and find, on careful measurement after threshing, that the yield of wheat has been 6½ bushels below the average, but of better than average weight, so that the actual deficiency is reduced to 6 bushels an acre, or 21 bushels instead of 27, as the yield of the crop for 1867 for the whole kingdom. We apply these figures to the acreage of wheat shown by the returns, and find that our last wheat crop will yield us only 9,700,000 quarters.

III.

Here enters the question of annual consumption, for on its amount and the degree in which it is affected by price depends the extent of our further requirements.

On this important point in our calculations, I have prepared a table of produce and imports for the five years preceding 1867, during which period the Irish returns show us that the breadth of corn has undergone little variation. It shows the fluctuation of yield and the total produce of each year, the foreign supply required and received during the succeeding year, the average price of that year, and the total supply of home and foreign wheat and flour in each year from 1862 to 1867. To this I have added my estimate of the produce of crop 1867.

Crop.	Rate of Produce of Bushels per Acre.	Total Home Produce.	Estimated Requirements	Foreign Supply Received during Succeeding Year.	—	Average Price of that Year.		Total Supply.
		Qrs.	Qrs.	Qrs.		*s.*	*d.*	Qrs.
1862...	29⅔	13,700,000	7,100,000	7,205,000	1863	44	9	20,905,000
'63....	35¼	16,300,000	4,500,000	6,727,000	'64	40	2	23,027,000
'64...	32½	15,000,000	5,800,000	6,029,000	'65	41	10	21,029,000
'65....	29	13,400,000	7,400,000	6,850,000	'66	49	11	20,250,000
'66....	25½	11,700,000	9,100,000	7,283,000	'67	64	4	18,983,000
	—	—	33,900,000	34,094,000		—		20,800,000 average of 5 years
1867....	21	9,700,000						

Within this short period is included 1863, the very best crop we have had for twenty years, and 1867, the worst but one. It presents in a very striking manner, therefore, the range of fluctuation in yield, supply, and price, and if carefully studied will show how each affects the others. The first four years were productive, and, the imports exceeding our need, prices fell to the lowest point since 1853. In 1866 the crop was inferior, the price began to rise, and imports at once increased. But not at once to the extent of our requirements, which were met by the accumulation of stock during the previous abundant years. These had been nearly worked out when the very deficient harvest of 1867 was reaped.

A glance at the table will show the rapidity of the changes in our home supply and requirements, and will tend to confirm the accuracy of my statement of the average yield. It shows us that the average yearly consumption of the country during the last five years has been 20,800,000 quarters.

To what extent is that affected by price? On this point I had the advantage of hearing the opinion of Mr. Newmarch, lately expressed in this room, in which I generally concur. It was to the effect that the consumption of bread is very constant, that everything is given up before bread, and that bread being the staff of life it must be had by the people whatever the price may be. This view is confirmed by inquiries which I have since made among some of the leading bakers in the most densely peopled quarters of Whitechapel in the east, and the Harrow Road in the north-west, one of whom has been thirty years in business, and has now three shops in a district entirely inhabited by the working classes. Their testimony is that the consumption of bread at present is very large, for, although dear, it is still the cheapest article of food within reach of the poor, the next substitute, potatoes, being scarce and very dear. Still I feel persuaded that price has some influence, and that the rise on the quartern loaf of household bread from 5½*d.* in 1864 to 9*d.*, the present price, must produce some effect on the total consumption. With that belief, I will assume that every 10 per cent. of additional price on the loaf, diminishes the consumption by at least 1 per cent.

Having now ascertained the produce of the last crop, the average yearly consumption, and the probable rate of economy caused by high price, we are in a position to fix with as great a degree of certainty as is necessary for all practical purposes the supplies which the country will need till next harvest. The only other points affecting the calculation, are the amount of old stock in hand from previous harvest and imports, and the length of time, varying between eleven and a-half and twelve and a-half months, over which the pressure may extend before a new harvest can be reaped. These, however, are questions that will not greatly affect the price for the whole year, though they may cause fluctuation, and I think Government ought not to offer any opinion on this, but leave it to the market. For the same reason, because it will to a certain extent be matter of estimate, Government may very well leave all parties interested to ascertain for themselves the relative yield of each harvest, and to act as each sees fit on his own sources of information.

My view of the last crop, and of our probable requirements and supplies for the present year, is as follows:—

		Qrs.
Average annual consumption		20,800,000
Home produce of 1867		9,700,000
		11,100,000
Old stock on hand almost exhausted, and therefore no deduction can be safely made on account of it.		
	Qrs.	
Economy in consumption caused by high price, 5 per cent.	1,040,000	
Eight days' consumption, saved by lateness of last harvest	460,000	
		1,500,000
Foreign supply required		9,600,000

This is at the rate of 800,000 quarters monthly.

Six months of the harvest year have now passed, during which our supplies have amounted to nearly 5,000,000 quarters. Thus far, therefore, the imports would appear to have equalled our requirements. And if my computations are well founded, the balance required during the six months till next harvest, is about 4,600,000 quarters. This is a monthly rate of 765,000 quarters, or somewhat less than the rate at which, during the last six months, the high prices ruling have brought us foreign corn. In the corresponding six months of last year, our foreign imports exceeded 700,000 quarters monthly, when the price of the preceding six months was 10*s.* less than at present. I think, therefore, that no apprehension need be felt as to adequate supplies till next harvest.

It will be interesting to consider here the rate of price which, in the past twenty years, has been found sufficient to draw out supplies, and then to complete this question by a short consideration of the sources whence we draw our annual supplies.

In regard to price, the first consideration, next to our own crop, is the character of the harvest in France. As a general rule, the seasons which are favourable or otherwise for England, are so also for France. In a good season, when we least require it, she gives us of her abundance, but we have to meet her as a competitor in the world's market, when, as in the last season, the crops in both countries are heavily deficient.

The worst harvest we have had in twenty years was 1853, following a deficient harvest in 1852. The deficiency of the home crop in 1853 was twice as great as that of 1867, but an average of 72*s.* 6*d.* in the following year, brought us sufficient supplies. 1860 and 1861 were short crops, but an average of 55*s.* 6*d.* sufficed to draw supplies. Since 1861 the crops have been above an average, till 1866, when the seasons changed, and the crop was short, and 1867, following on that, is the worst we have had since 1853. The pressure has been increased by the short crop of potatoes and their high price, and by the bad harvest in France, and generally in Western Europe. But up to this date our supplies have been ample, and we have some comfort in the prospect of the next crop, which was sown in one of the best seed times known, and, under the inducement of the high price at that time, on a largely increased breadth of land.

IV.

Some instructive tables are given in the returns, showing the area and crops of the various countries whence we draw our chief supplies of corn. The Board of Trade tables furnish the imports. The following figures, in their order, give the proportions in which the various countries, during the twelve years ending with 1866, have contributed to our wants in wheat:—

	Per Cent.
United States	35
Germany	20
Russia	17
France	12
Egypt	6
Other countries	10
	100

The most distant region in the list gives us more than one-third of the whole. The crop reaped on the prairies of the Mississippi finds its way one thousand miles to the sea-board, and is then transported three thousand miles by sea, has to bear all the cost of a double transhipment, the profits and commissions and charges of the various persons through whose hands it must pass, and the final duty of 1*s.* a quarter, before it comes into competition with the home-grown crop. It is not many years since men could prove that the cost of a certain limited number of miles of transport would exhaust the entire value of corn, and that the range within which it was procurable for our wants, must be therefore comparatively limited. The extension of railways, the widening of canals, the use of steam elevators, and the ingenuity and enterprise of the American people, have wonderfully extended that limit. Russia also, already a large contributor to us, will by the same means have her great plains brought year by year more within reach of Western Europe.

So widely spread are the sources of supply, that it is difficult to conceive any circumstance but one that could seriously affect us. We have in the period to which I refer, had a war with Russia, during two years of which there was a total suspension of Russian supply. But Egypt and Spain, in those years, made up the whole of the deficiency. It has never happened that all the countries have had a bad season at the same time. If Western Europe fails, America or Egypt is prolific. In 1856 France could spare us only 30,000 quarters, but America gave us 2,300,000. In 1859 America sent only 100,000, but France, the same year, close upon two millions. For the next four years, all through the war to the end of 1864, America was blessed with bountiful harvests, and poured upon us her superabundance, with little reference to price; and during these years France had very little to spare. But in 1865 and 1866 seasons changed again—America fell to 30,000 quarters, and France rose to nearly two millions.

The one circumstance which might seriously affect us, would be a continued cessation of supplies from America. Of the 11,000,000 quarters we imported in 1862, she gave us five; and, as the figures show, we have received for many years from her, on the average, more than one-third of our yearly supply. In cotton, an import second only in necessity and value to corn, she gives us more than two-thirds of all we receive. Let us hope that interests so great and so mutually beneficial as those which bind together the two great Anglo-Saxon races on opposite sides of the Atlantic may be more and more cemented by acts of mutual confidence and good-will.

How vast her capacity of export may become, it is impossible to conjecture. From the official returns of her last wheat-crop, very little of which can have yet reached us, she could, after retaining enough for her own consumption, spare us one-half of all we shall this year require. She produces annually upwards of one hundred million quarters of Indian corn. Indeed, so great and so constant is the yield of this prolific grain, that there may be said to be practically no limit to the supply which in any year a sufficient price could bring into the market.

The effect of good or bad seasons is more intensely felt in all the chief corn countries than in our own. This arises from our higher average rate of produce, and the consequent smaller extent of surface at the mercy of the seasons. A bushel an acre, above or below the average, makes a difference to us of less than half a million quarters in the total yield. In the United States, each bushel indicates a million and a-half quarters, and in France upwards of two million quarters of variation. Hence the suddenness and severity of the fluctuations in those countries as shown by their exports to us.

I cannot leave this part of the subject, without noticing the extremely low average yield of wheat in France. She stands lowest in the scale. England I have stated at 28, Ireland is 24, Austria, Spain, and Holland 23, Belgium 21, and France only 15½ bushels an acre. If this is a correct statement of the yield of France, her average rate of produce is less than that of the very worst crop in England during the last twenty years. It is indeed precisely the same as the yearly average produce of Mr. Lawe's experimental plot, on which for twenty-four years in succession he has grown wheat without manure.

In 1855, while travelling in France, my attention was drawn to the very low rate of her acreage yield of wheat as compared with ours, and after publishing my own views on the question, I had an opportunity of discussing them with the eminent French statist M. Léonce de Lavergne, who agreed with me that, apart from the difference in soil and climate, it is probably to be accounted for by the fact that, while our grass and green crops, or restorative area, are as two to one of our corn, France is exactly the reverse, her corn or exhaustive crops being as two to one of her grass and green crops. But she, too, is becoming more meat producing, and the margin she has to fill up, by increase of yield, is so wide, that a rise of only half the space between her present yield and that of England, would enable her to spare a surplus greater than we have ever yet required from all foreign countries in a single year.

V.

Having thus endeavoured to explain what I conceive to be the main value of these returns, in affording a basis for reckoning, with accuracy, and at an early period, the supplies of corn needed for our consumption, and having dwelt with some minuteness on the various elements which ought to be taken into the calculation, I will now touch on the other great branch of our agricultural wealth—the live stock, and then briefly consider certain changes in our agricultural management, revealed by the returns, which have naturally flowed from the adoption of free trade.

The returns of live stock having been made at different periods of the year, do not yet help us in speaking with certainty as to how far the losses by cattle plague have been made good. Up to October, 1867, when the plague had died out, about 130,000 cattle had died, and 57,000 healthy cattle had been killed to prevent the spread of the disease. The returns show an increase of 161,000 cattle in 1867 over the preceding year. So far as numbers go, therefore, the actual deaths by disease would appear to have been fully made good. But until another year's return is made from the same period as 1867, we cannot depend on the figures representing the same comparative data. A like remark is even more applicable to sheep, the figures in the year 1867 being to a large degree swelled by including lambs born at a date subsequent to that of the returns of 1866.

They enable us, however, to reckon the approximate number and value consumed as food, and, along with the returns of crop, to compare the value of our entire agricultural produce with the foreign supply. As this is a point of the greatest interest and importance, I have compiled a table with as much care and consideration as I can command, showing the average amount and value of the whole agricultural produce of the United Kingdom, consumed annually, the value of the same articles received from abroad, and the proportion in which the total supply is contributed by the foreigner:—

	Home Produce.	Foreign Supply.	Proportion of Foreign to Total Supply.
	£	£	
Corn of all kinds	84,700,000	25,000,000	One-fourth
Beef and mutton	47,200,000	6,500,000	One-ninth
Butter and cheese	30,100,000	8,400,000	One-fifth
Potatoes	18,000,000	200,000	—
	180,000,000	40,100,000	One-fifth

To these must be added the annual product of wool, 8,000,000*l.*, and of flax 2,000,000*l.* sterling, but these enter into the manufacturing industry of the country, and do not come within our present inquiry. There is no return of horses for Great Britain, and they cannot therefore be included, and the pigs are comprised in the meal and potatoes.

The home produce is thus supplied by each of the three divisions of the kingdom:—

	England.	Scotland.	Ireland.	Total.
	£	£	£	£
Wheat	28,500,000	900,000	2,100,000	31,500,000
Barley	16,400,000	2,800,000	1,200,000	20,400,000
Oats	10,900,000	6,200,000	8,600,000	25,700,000
Beans, peas, and rye	6,500,000	350,000	150,000	7,000,000
Potatoes	4,100,000	1,900,000	12,000,000	18,000,000
Cattle and dairy produce	32,500,000	6,500,000	19,500,000	58,500,000
Sheep and wool	18,400,000	4,400,000	4,100,000	26,900,000
Flax	—	—	2,000,000	2,000,000
	117,300,000	23,050,000	49,650,000	190,000,000

And in the following proportions in each country per head of the population, and per head of the persons, according to the census of 1861, possessing or working the land, and engaged in its cultivation:—

	England.		Scotland.		Ireland.	
	Per Head.	Per Producer.	Per Head.	Per Producer.	Per Head.	Per Producer.
	£ *s.* *d.*	£ *s.*	£ *s.*	£ *s.*	£ *s.* *d.*	£ *s.*
Corn	2 18 6	32 2	3 5	30 -	2 3 -	12 15
Cattle and sheep	2 7 6	26 8	3 9	31 6	4 4 6	25 5
Potatoes	- 4 -	2 2	- 12	5 9	2 3 -	12 15
Flax	—	—	—	—	- 7 -	2 2
	5 10 -	60 12	7 6	66 15	8 17 6	52 17

Though these figures are offered only as an approximate valuation, they are interesting as indicating the relative results of agriculture in the three divisions of the kingdom, and the important share which Ireland, even in her present depressed condition, contributes to the whole supply of food.

The foreign produce in greatest supply is that which can bear longest carriage, and can be packed in least bulk. Whilst we receive one-fourth of our corn, cheese, and salt butter from abroad, the foreigner sends us, as yet, only one-ninth of our meat, and one-ninetieth of our potatoes. Those who can recall the controversies of twenty years ago on the probable effects of free trade, will, I hope, pardon me for introducing a passage written by me at that time, in which I then ventured to speculate on the probable effect of free trade on British agriculture:—" As the country " becomes more prosperous, the difference in the relative value of " corn and stock will gradually be increased. The production " of vegetables and fresh meat, hay for forage, and pasture for dairy " cattle, which have hitherto been confined to the neighbourhood " of towns, will necessarily extend as the towns become more " numerous and populous. The facilities of communication must " increase this tendency. Our insular position, with a limited " territory, and an increasingly dense manufacturing population, is " yearly extending the circle within which the production of fresh " food—animal, vegetable, and forage—will be needed for the daily " and weekly supply of the inhabitants and their cattle, and which, " both on account of its bulk, and the necessity of having it fresh, " cannot be brought from distant countries. Fresh meat, milk, " butter, vegetables, and hay, are articles of this description. They " can be produced in no country so well as our own, both climate " and soil being remarkably suited to them. Wool has likewise

" increased in value as much as any agricultural product, and there " is a good prospect of flax becoming an article of extensive " demand, and therefore worthy of the farmer's attention. The " manufacture of sugar from beet-root may yet be found very profitable to the English agriculturist, and ought not to be excluded " from consideration. With the great mass of consumers, bread " still forms the chief article of consumption. But in the manufacturing districts, where wages are good, the use of butchers' " meat and cheese is enormously on the increase; and even in the " agricultural districts, the labourer does now occasionally indulge " himself in a meat dinner, or season his dry bread with a morsel " of cheese. Among the better classes, who can afford it, the " expenditure in articles the produce of grass and green crops, is " nearly nine times as great as in corn.

" This is the direction in which household expenditure increases " when the means permit. It is reasonable to conclude that the " great mass of the consumers, as their circumstances improve, will " follow the same rule. The only species of corn which has risen " materially in price since 1770 is barley, and that is accounted for " by the increasing use of beer, which is more a luxury than a " necessary of life. Every intelligent farmer ought to keep this " steadily in view. Let him produce as much as he can of the " articles which have shown a gradual tendency to increase in " value."

Writing now, with the additional experience of eighteen years of free trade in corn, I can do no better than repeat that advice. The great margin still to be filled up by our own farmers is the daily supply of fresh meat, fresh dairy produce, vegetables, and barley. Since 1850 the price of bread on the average has remained the same, while that of meat, dairy produce, and wool has risen 50 per cent., notwithstanding an immense and increasing import of these articles. This and the steadily advancing price of barley, to which I then referred, is the true explanation of increasing rents and agricultural prosperity, notwithstanding increasing receipts of foreign corn.

In the production of barley, as in that of long lustrous wool, this country is still without a rival. Since 1835, when tithes were commuted into a money payment, the average value of the three kinds of corn together has not on the whole altered; but the price of wheat has fallen 12 per cent., while barley has risen 8, and oats 4. The growth of barley in this country has nearly doubled in extent within the last twenty years. While it yields the largest weight per acre of any kind of corn, it seems the least exhaustive to the soil, and leaves it in the best condition, as it occupies the ground for the shortest period from seed time to maturity.

VI.

I come now to the application of my paper by the question, how much do these vast supplies yield to the daily wants of the people, in what proportions are they distributed among them, and what modifications seem probable in our system of husbandry?

Writers on dietetics tell us that one pound of bread, one pound of potatoes, and six ounces of meat are required for the minimum of daily healthy diet. I have computed the amount of all our supplies, home and foreign, of wheat, potatoes, and meat, have converted the wheat into flour, and the flour into quartern loaves, and I find that if our bread, potatoes, and meat were equally spread over the population of the United Kingdom, the present supply would give one pound of bread and one pound of potatoes, but only two ounces of meat, and the equivalent of one ounce of butter or cheese daily to each person. But it is not equally spread, the proportions in Britain and Ireland being really very different. The people in England and Scotland have among them a pound and a quarter each of bread, and half a pound of potatoes a-day; the people in Ireland four and a-half pounds of potatoes each, and only a quarter of a pound of bread.

Whilst there is thus in Ireland still far too great a dependence on the potato for food, there would seem to be room in England for some additional supply of that esculent, so wholesome as a portion of diet. The home supply might be increased with great advantage to the consumer by the extension of potato husbandry on suitable soils, in all the English counties, near the seats of large populations.

The proportion of population in various European States to each acre of potatoes, and therefore the degree of their dependence on it for food, affords a tolerable indication of their material prosperity. They stand in the following order:—England 66 people to each acre of potatoes; Wales, 26; Scotland, 20; Denmark, 20; Belgium, 13½; Holland, 13; France, 12½; Sweden, 12; Prussia, 5½; Ireland, 5½. Prussia and Ireland thus stand out pre-eminently as potato countries. They have consequently suffered the most severely by the disease of that root, and the emigration from both countries has been greater than from all other European States. But, notwithstanding the past, so great is the temptation presented by this prolific root to the necessities of a poor population, that its culture in Ireland within a very few years after the famine rapidly revived, and at this moment the production of potatoes in proportion to the diminished numbers of the people, and their dependence on it for their food, is almost as great as it was before 1845.

In Prussia, the production of potatoes is also enormous, but the root is not used as in Ireland, solely as an article of food. The

German excise regulations are so framed as to admit of greater freedom of action on the part of the farmer, who is thus enabled to unite with his agriculture the business of distillation. He extracts the spirits for sale, and retains on his farm the other feeding properties which his roots possess. Two million tons of potatoes are thus annually disposed of in Germany. German spirits find their way all over Europe, and, notwithstanding the enormous rate of duty to which, in common with the spirits produced in those countries, they are everywhere subjected, the business thrives and increases.

All our root crops contain varying proportions of sugar, which in many cases might, in one form or another, be extracted with advantage on the farm; the other qualities of the root being used for cattle food. But the stringency of our excise laws has hitherto prevented every attempt so to utilise it. Now the British Islands, and Ireland especially, are pre-eminently fitted for the production of root crops and barley. Why should they be restricted in the conversion of these to the most profitable use? The time seems to have come for a reconsideration of our excise laws, and for the substitution, if it be possible, of such a system of levying duties as should leave to the producer the most perfect freedom for the fullest development which skill and capital might enable him to make.

In the extract already read, reference was made to flax and to sugar, as articles likely to form a future object of culture to the British farmer. Flax has now attained considerable importance in Ireland, the annual value of the home growth in recent years exceeding two millions sterling, or nearly one-half of the total value used in that important branch of our manufactures. Sugar from beet was tried in Ireland twenty years ago, but failed, chiefly for want of the necessary arrangements to carry out the extraction and purification of the juice. The question has this year been revived by some persons as a remedy for the ills of Ireland; by others as a branch of national industry, which, if it succeeds, will be alike advantageous to the agricultural interests of the United Kingdom, and to the consumers of sugar. The steady and continuous extension of beet-root sugar on the continent, within recent years, sufficiently proves its remunerative character; for wherever the culture has been established, the employment and wages of labour have been increased, the number and quality of fattened cattle have augmented, and the land has become more productive and more valuable. Having been consulted as to the most suitable county in which to make a beginning in England, I examined the agricultural returns, and suggested Suffolk, that county being the most extensive producer of mangold near the metropolis. And I am glad to be able to announce that arrangements have now been completed to try the experiment in that county, this year, on a scale sufficiently large to test its probable success.

I might now proceed to many most interesting points, affecting agriculture, disclosed by these returns—such as the relative productiveness of districts of large and small farms; of corn and grass; of sheep and cattle; of dairy husbandry; of the course of crops in particular districts; of the importance and wealth of certain counties as compared with others; the extent of farms as influenced by climate and soil, on all of which the most valuable information is afforded. But these questions must be left to other labourers, or to another time. Suffice it now, in conclusion, to say that the effect of free trade on the food of the people of this country has been to moderate the price, and immensely increase the supply of food. And for my own part, I feel thankful that in the House of Commons I was the instrument of carrying a resolution which led to the collection of these returns. For, in supplying a basis of certainty in the acreage, they have given us the power of answering, with accuracy and in good time, the question whence the thirty millions of people, who live within the narrow limits of the British islands, shall year by year be provided with their daily bread.

NOTE.—The prices and proportions on which the valuation of the annual produce of live stock was made are as follow:—Dairy produce of cows in England, 10*l.* each; in Scotland, 8*l.* each; Ireland, 7*l.* each. One-fourth of the whole of the cattle in the respective countries is assumed to be sold annually at 16*l.* each in England, 14*l.* in Scotland, and 10*l.* in Ireland. Of sheep, the wool is valued in England and Ireland at 8*s.* a-head, and in Scotland at 6*s.* One-third of the sheep in number in England and Ireland, and one-fourth in Scotland, are assumed to be sold every year at an average price of 35*s.* each.

APPENDIX.

Estimated, Compared with Ascertained Extent of Crops.

In my letters in 1850 as "Times'" commissioner, the extent of the various crops in England was estimated, and the estimates are here shown in comparison with the actual acreage now ascertained by the returns:—

	Mr. Caird's Estimate in 1850.	Agricultural Returns in 1867.
	Acres.	Acres.
Wheat	3,416,000	3,140,000
Barley	1,417,000	1,892,000
Oats and rye	2,000,000	1,550,000
Beans and peas	1,139,000	820,000
Total corn crops	7,972,000	7,402,000
Green or root crops and rape	2,416,000	2,700,000
Bare fallow	1,000,000	753,000
Clover	2,277,000	(1866) 2,296,000
	13,665,000	13,151,000

The changes shown by these figures are—

		Acres.
A diminution in wheat of		280,000
" oats		450,000
" beans and peas		320,000
" bare fallow		247,000
		1,297,000

And—

	Acres.	
An increase of barley	500,000	
" root crop	300,000	
" clover	20,000	
		820,000
Diminution		477,000

The difference has probably gone into permanent pasture.

These changes are quite in accordance with what might have been anticipated, and tend to confirm the accuracy of the estimate made in 1850.